Institute for Empirical Research in Economics
University of Zurich

Working Paper Series
ISSN 1424-0459

Working Paper No. 400

Academics Appreciate Awards
A New Aspect of Incentives in Research

Bruno S. Frey and Susanne Neckermann

December 2008

ACADEMICS APPRECIATE AWARDS

A New Aspect of Incentives in Research

by

Bruno S. Frey*

University of Zurich, ETH Zurich

CREMA – Center for Research in Economics, Management and the Arts, Switzerland

and

Susanne Neckermann+

University of Zurich

(This version December 1st, 2008)

Abstract:

This paper analyzes awards as a means of motivation prevalent in the scientific community, but so far neglected in the economic literature on incentives, and discusses their relationship to monetary compensation. Awards are better suited than performance pay to reward scientific tasks, which are typically of a vague nature. They derive their value, for instance, from signaling research talent to outsiders. Awards should therefore be taken seriously as a means of motivating research that may complement, or even substitute for, monetary incentives. While we discuss awards in the context of academia, our conclusions apply to other principal-agent settings as well.

(100 words)

Keywords: Awards, Money, Incentives, Academia, Research.

JEL Classifications: C93, J33, M52

---

* Corresponding author. Professor of Economics, Institute for Empirical Research in Economics, University of Zurich, Winterthurerstrasse 30, CH-8006 Zurich, Switzerland. E-mail: bsfrey@iew.uzh.ch.

+ Researcher, Institute for Empirical Research in Economics, University of Zurich, Winterthurerstrasse 30, CH-8006 Zurich, Switzerland. E-mail: sneckermann@iew.uzh.ch.

I. Money and Awards

Did Albert Einstein earn good *money*? Was Immanuel Kant rich? How financially successful was Newton? Most people would probably consider these questions inappropriate or even offensive. They take it for granted that these geniuses were motivated by a quest for truth and not by a craving for monetary gain. They would – at best – admit that the geniuses had to support themselves materially, and provide a decent standard of living for themselves and their families. It is intriguing to question the extent to which successful academics are motivated by monetary gain. The question is of immediate policy relevance, as there is a strong movement to extend pay-for-performance programs beyond for-profit firms to not-for-profit firms and, in particular, to academia. An extreme example is the Vienna University of Economics and Business Administration, which pays ¤ 1000 for a paper published in an 'A journal' and ¤ 3000 for a paper published in an 'A+ journal'.[1] At most universities, pay-for-performance is applied in a less rigid way, but salaries are still increasingly linked to the researcher's publication, citation record, and successfully securing outside research funding.

At the same time, a second development can be observed in academia; namely, an explosion of awards. In addition to the time-honored titles *doctor honoris causa* or *academic senator,* universities, academies and professional societies hand out a large number of awards, honors, and prizes, ranging from a multitude of "best paper awards" to the highly esteemed Nobel Prizes. Using the revealed preference approach, these facts suggest that academics are very fond of awards. Good examples are Milton Friedman and Gary Becker, with the long list of awards they themselves indicate in the honors and awards section of *Who's Who in Economics* (Blaug and Vane, 2003). They list no less than 50 and 26 awards, respectively.

These two developments, the rising prevalence of pay-for-performance programs and the

---

[1] See http://bach.wu-wien.ac.at/bachapp/cgi-bin/fides/fides.aspx?journal=true.

increasing use of awards, occur simultaneously and independently of each other. The adherents of pay-for-performance as an instrument to promote research implicitly suggest that money is the major, if not the only, incentive to induce scholars to do plenty of good research. The adherents of awards as incentives tend to assume that recognition – for example, through receiving awards – is a more important source of motivation. An effort is made not to "pollute" an award by mentioning the money that goes with it.

This paper presents a first attempt at analyzing awards as a major means of motivating researchers in academia. Monetary compensation and awards are compared as instruments providing incentives for scientific research. We assume that utility depends positively, and with decreasing marginal effects, on income and on social recognition, as well as on intrinsic motivation, i.e. the enjoyment of the research activity per se. While the exact specification of the utility function is not important for our purposes, it is central that all three factors enter the utility function directly.

Before we get involved in the analysis, it is worth highlighting two caveats that complicate the analysis. First, in academia there is more than one single clear-cut principal-agent relationship relevant for setting incentives. There is a close principal-agent relationship between a university (represented by the department chair, dean, rector or president) and its scholars as employees. There is a similar, but less close relationship between academies, foundations, or professional societies and the scholars in their respective disciplines. The latter also set incentives, for instance, in the form of awards or honorary fellowships. Second, there is considerable interdependence and simultaneity between awards and monetary compensation that complicate the discussion of either instrument in isolation. For example, income depends positively on research success directly, because of variable salary components, and indirectly, because successful researchers can attract higher amounts of external funding. At the same time, income may also rise due to the receipt of an award. Awards in turn increase income,

directly and indirectly. They directly increase income when they come with a monetary bonus. They indirectly increase income when they help to build up a reputation, make the person's research known to a wider audience, and facilitate access to external funding. The positive income effects of awards are often caused by the capacity of awards to signal otherwise hard-to-assess qualities of a researcher to outsiders. Social recognition, on the other hand, may be generated by good research and by receiving awards. At the same time, receiving money for research may, under certain circumstances, also provide social recognition similar to receiving an award. This is, for instance, implicit in the expression "to be awarded money". The preceding two points make clear that the differences between monetary compensation and awards are far from simple and clear-cut. However, we still consider a comparison of the two instruments valuable, as trade-offs and decisions on their respective usage have to be made when setting incentives for researchers.

In the first part of this paper, we discuss monetary compensation and awards in their purest form, i.e. monetary compensation deprived of any social recognition, and awards with no direct or indirect material benefits, highlighting the conditions that drive the effectiveness of both instruments. Section II deals with the extent of *applicability* of the two instruments, which depend on external constraints to their use. These constraints are ideology (section II.1), feasibility (section II.2), control over the instruments (section II.3), and the required level of performance measurement (section II.4). Section III then discusses the *effectiveness* of the two incentives by comparing the size of their marginal benefits (section III.1), the value to the recipients (III.2), the instruments' signaling capacity (III.3), their effects on intrinsic motivation (III.4), and their effects on the creation of loyalty (III.5). In Section IV, the major strengths and weaknesses of the two instruments are discussed and it is argued that an effective incentive system must combine them in a way that exploits the comparative advantages of each instrument, while minimizing the effect of the respective disadvantages. Finally, Section V

concludes.

Our knowledge about the comparative effectiveness of money and awards as incentives is severely limited, especially with regard to awards. There is almost no serious empirical evidence on the effects of awards on (research) performance, mainly because the properties and effects of awards have rarely been studied by economists or by other social scientists.[2] In view of this large gap in knowledge, it is unwarranted to simply take money as the best and only effective motivator for scientific achievement, as was implicitly done in the recent installment of pay-for-performance programs in academia. The study of awards, and their impact on performance, is a wide-open area for meaningful research.

In the remaining part of the paper, the following conclusions will be derived and supported by empirical evidence:

- Monetary incentives are *not* the only viable and effective instrument to induce successful research. Awards should also be considered as a means to further research performance.
- Monetary incentives applied to research not only have the well-known positive incentive effects, but may also exhibit some severe disadvantages, such as when they crowd out the intrinsic motivation to do interesting and path-breaking research. This effect is related to the findings of Amabile (1996, 1998), who shows that extrinsic rewards decrease creativity. Further, the application of performance-pay programs is often restricted by bureaucratic rules and by difficulties in measuring research

[2] Exceptions are the theoretical analyses of Gavrila, Caulkins, Feichtinger, Tragler, and Hartl (2005), Besley and Ghatak (2008), Frey (2005, 2006, 2007), and Frey and Neckermann (2008), as well as the empirical studies Neckermann and Frey (2007), Neckermann and Kosfeld (2008), and Neckermann, Cueni, and Frey (2008). Precursors are Hansen and Weisbrod (1972).

performance adequately. This does not mean that monetary incentives never work. However, several factors characteristic for the academic setting make it less likely that performance pay has the desired impact. Essential features of the academic environment are the substantial amount of autonomy, multi-tasking, creativity, and immeasurable outputs. In such a setting, incentive pay may be considered inappropriate, or may even be counterproductive, as it leads to strategic behavior and tends to undermine intrinsic research motivation. When discussing the effectiveness of incentives, it is therefore essential to consider the conditions under which they are applied.

- Awards have certain features that render them attractive in the academic setting. Award givers can subjectively evaluate overall performance ex post, as long as this is done in a transparent and fair way. Hence, awards are better suited than money to reward vague tasks, because the criteria for monetary compensation almost always have to be specified clearly in advance. Further, awards motivate scholars – due to their value in signaling research talent and motivation – characteristics that are important in academics, but which are typically hard to assess for outsiders. Hence, awards may play important roles in the career of academics. Further, awards are valued because they convey appreciation and recognition on the part of colleagues and the public. They may thereby raise intrinsic motivation to do research and generate loyalty to the awarding institution.

- A combination of money and awards may sometimes help to overcome the disadvantages of either instrument used in isolation. However, there are limits to combining the two instruments, mainly because awards lose many of their unique features when the monetary component becomes too salient.

II. The Applicability of Money and Awards

In order to highlight the characteristics of money and awards, this section and the next section consider the two incentive instruments in their "pure" forms, i.e. monetary incentives that do not generate any social recognition, and awards *without* any impact on current or future material well-being. In the following, the external constraints on the applicability of the two instruments are discussed. The characteristics of monetary inducements are a well-known part of standard economics and are therefore only mentioned briefly.

1. Ideological Restrictions

In most current democratic market economies, both money and awards are *politically* acceptable instruments and can be used freely. The situation is quite different in communist and socialist countries, where the use of performance bonuses is often suppressed. Even in democratic countries, there is an old tradition, going back to Leibnitz, claiming that monetary incentives for research are *socially* undesirable. Academia is taken to be a "Republic of Science", with its own values and rules inconsistent with an economic market (Polanyi, 1962; Merton, 1973). Recently, the ideological system in academia has been changing and pay-for-performance programs have been increasingly accepted.

2. Feasibility

Using money as an incentive is severely restricted when academic institutions are short of funds. This has often been the case in the past, and is still true in many regions of the world (for instance, in Africa, South America and Southern Europe). Limited funds constitute a severe restriction. Field experiments have demonstrated that one should "pay enough or not pay at all" (see Gneezy and Rustichini, 2000), as the payment of low amounts might lead to worse

outcomes than setting no incentives at all. Awards, in contrast, are less costly and are therefore widely used by fund-restricted institutions, such as NGOs, academies and professional organizations. The award itself typically costs little in terms of the material used. Some costs arise from the award ceremony, and from the selection and screening process necessary when selecting the recipients. In the case of academia, these costs are typically low: awards mostly consist of a certificate, and screening costs are moderate as the set of potential recipients is often limited and committee members have some idea about the merit of each scientist in the respective community. Further, research institutions derive additional benefits from awards, as they can use the occasion to publicize their existence and activities. The traditional "*dies academicus*" or degree-day has always been understood in this way.

3. *Extent of Control over the Instruments*

The scope for handing out money may be restricted by public rules limiting the amount of money to be spent, or prohibiting pay differentiation among researchers, who are public sector employees in many countries. In contrast, public and private institutions have full control over awards. Those dissatisfied with not getting an award cannot turn to a court. Indeed, state orders are one of the few areas not subject to legal scrutiny.

4. *Performance Measurement*

Pay-for-performance programs are based on the notion that performance can be accurately measured, so that the amount of the bonus can be calculated. If performance measures are noisy, much of the incentive effect is lost. If an academic feels that the exact amount of a monetary reward does not correspond to his or her research achievement, he or she is disappointed and his or her motivation for research may falter. As many performance

dimensions of academics are immeasurable, or can only be measured partially, specifying criteria for performance-pay may lead to the well-known multi-tasking problem, i.e. a distortion of behavior concerning those aspects of the job that are relevant for the bonus. It is well known that research performance is difficult to assess. When looking at the publication record of an academic, the performance measured, for instance, greatly depends on the particular approach (see Frey and Rost, 2008, or the recent analysis by the International Mathematical Union as reported by Adler, Ewing and Taylor, 2008). As a consequence, an effective application of pay-for-performance programs to research is difficult.

In contrast, awards do not require an exact evaluation of performance. It suffices that it is approximately known what the overall performance is, because the award itself provides general recognition rather than recognition counted in exact sums of Dollars or Euros (examples are “Teaching Awards” or “Best Paper Prizes”). An award may even be given for “Lifetime Performance”,[3] which is a rather vague, but still valuable concept. Theoretically, many monetary bonuses are also subjectively determined ex post. However, monetary payments are subject to a much stricter set of rules, and employees may even sue employers in the cases when they disagree with the stipulated amount. Therefore, most bonuses are determined according to a clear and transparent set of quantifiable performance measures.

III. Effectiveness of Money and Awards as Incentive Instruments

This section compares five ways in which the two instruments, money and awards, differ in

[3] One example is the Nobel Prize, which – at least in economics – is often awarded for lifetime performance, rather than for a specific piece of work. This practice is followed, despite the fact that Nobel explicitly stated in his last will that the income should be "distributed annually in the form of prizes to those who during the preceding year have conferred the greatest benefit on mankind."

their effectiveness in incentivizing research.

1. Marginal Effect

Recent empirical research on happiness (a reasonably good proxy for utility) has shown that the marginal utility of money is, indeed, decreasing exactly in the way postulated by standard economic theory. An increase in income raises the happiness of poor people considerably, while the effect on people with higher income is relatively small.[4] There is no evidence on how the marginal benefit of awards changes with the number of awards received. However, there are some models on status incentives (e.g. Auriol and Renault, 2004) that assume decreasing marginal benefits and a positive cross-elasticity between income and status. It seems plausible to make the same assumptions for awards. In order to determine whether to give money or an award to a particular person, what matters, in our context, is whether the marginal utility of money or awards is decreasing more quickly. If you take the expression "you can never have enough", there are some who believe you can never have enough money. Then there are others who believe you can never have enough recognition, and that the marginal utility gained by receiving more and more awards remains high. Thus the issue must remain open.

There is another effect to be considered, namely the induced change in utility over time. According to the (extreme version of the) "Easterlin Paradox" (Easterlin, 1974, 2003), an increase in income first raises utility, but then this increase wears off over time. After a year, between two thirds and three quarters of the utility increase has evaporated (Frey and Stutzer, 2006). Over time, this results in an increase in the per capita income of a country being accompanied by a (nearly) constant happiness level. Again, there is no evidence for awards. However, one may once more draw on the literature on status, which has shown that people

---

4 See Frey and Stutzer (2002a, 2002b), Layard (2005), Deaton (2007), and Frey (2008).

are much slower to adapt to higher status than to higher income (Di Tella, Rafael, and Robert MacCulloch, 2006). Therefore, an increase in status leads to a more sustained increase in utility than income does.

2. Value to the Recipient

Money is of great value to the recipient because it is the most fungible of all goods, an insight long since central to economic thinking.[5] The transfer of money to the recipient is also a clear and credible signal of appreciation and recognition, as money is a scarce resource.

In contrast, awards mainly consist of a "piece of ribbon" or a paper certificate of no significant material value. Therefore, there is no apparent constraint when it comes to handing out awards. This can easily result in an award inflation, as has indeed happened in some countries (examples being the Soviet Union and the German Democratic Republic), where so many orders, medals, and decorations were handed out that they lost much of their value. As the value of an award critically depends on its scarcity, the giver must resort to some credible self-binding mechanism if he wants to maintain its value. One such mechanism is to combine the award with money. This is an effective constraint as funds are limited. A second mechanism is a formal restriction, e.g. in the statutes of the association, of the number of awards handed out. Such a restriction can take various forms. One can either restrict the number of awards by having a fixed number in circulation. This procedure holds, for example, for some state orders such as the Most Noble Order of the Garter or the Most Ancient and Noble Order of the Thistle, which are limited to 25 and 16 bearers, respectively. Another possibility is to hand out awards only at fixed intervals and only to a fixed number of persons. That is the case for the John Bates Clark Medal, which is bestowed on one person every two years. Binding oneself by

---

[5] See e.g. the comparison with gifts (Waldfogel, 1993).

restricting the number of possible recipients does not always work, because the award giving institution has a short-term incentive to increase the number receiving the award at the expense of the award's reputation and value in the future. This is the case with the French "Légion d'honneur", which is often given to academics. The number of recipients is strictly limited (1,250 Commanders and 10,000 Officers), but has been awarded to many more (3,626 Commanders and 22,401 Officers; see Frey, 2005). In academia, restrictions in the number of awards are often implicit and known by custom. It is, for example, generally known that good universities give out honorary doctorates to only one or, at most, two people per faculty per year.

Another aspect concerning the value to the recipient is that the value of monetary incentives is unambiguous – provided there is no rampant inflation. Hence, it is exogenous to both the award-giving institution and the recipient. In contrast, the value of the award is endogenous and depends on many factors, such as its scarcity, which can be controlled by the giver, and the prestige of the award-giving institution, which can partly be influenced by the recipient. This may provide additional incentives to the recipient of an award, as he or she can increase the value of the received honor with his or her research success, which in turn raises the prestige and reputation of the award-giving institution.

3. Signaling Capacity

In general, academic talent and research success are hard for outsiders to observe. Outsiders can assess the quality of research by reading the researcher's publications, thereby inferring his or her talent. However, doing so requires a substantial amount of investment in terms of time and knowledge. Therefore, signals of quality and ability are greatly esteemed in the academic setting. In general, monetary compensation is not publicized. Receiving a bonus for

research success helps little, if at all, in signaling this information to outsiders. The contrast to awards is striking. An award is always given at a public ceremony and it is always clearly specified and publicized why the person has earned it. The "laudatio" which is normally given at a solemn celebration, such as the "*dies academicus*", plays a large role. Hence, a clear signal is given to both insiders and outsiders. The signaling value of an award is increased when it is publicly known due to receiving wide media coverage. A prominent example is, of course, the Nobel Prize, which turns some scholars into celebrities.

There is a second dimension to signaling, namely self-signaling or self-image concerns. Bénabou and Tirole (2003) lay out a framework, suggesting that individuals typically do not remember their own motivations accurately. Therefore, they infer this information from their behavior and the outcome of their behavior. When individuals are given money for their research success, they may infer from this that they engaged in the research activity mainly to earn money and not because they were interested in or fascinated by the subject. This may then result in a decrease of intrinsic motivation. Awards are less powerful extrinsic motivators, so this should not happen, or to a lesser extent, with awards. Specifically, because the intrinsic motivation and endurance of a researcher is often emphasized in the "laudatio", intrinsic motivation may even be fostered.

4. Crowding-out Effects on Intrinsic Motivation

Intrinsic motivation has been found to be crucial for successful and original research (Amabile, 1996, 1998). In addition to the signaling aspect discussed above, outside interference in the form of money can crowd out the intrinsic motivation to do innovative research due to the psychological substitution mechanism (Frey, 1997). The crowding-out effect has been supported by considerable empirical evidence (Gneezy and Rustichini, 2000a; for a survey, see

Frey and Jegen, 2001). The crowding-out effect is partly caused by the fact that performance bonuses often make strict monitoring necessary, so that this intervention is perceived as controlling rather than supportive. Awards, on the other hand, can do without strict performance measurements, as they only require a broad assessment of performance. Hence, awards are probably less likely to be perceived as controlling. However, it is, of course, true that rightly administered pay-for-performance programs may avoid crowding out intrinsic motivation, just as badly administered award systems may well promote it.

5. Creation of Loyalty to the Giver

Experimental research suggests that "[…] money brings about a self-sufficient orientation in which people prefer to be free of dependency and dependents […]" (Vohs, Mead and Goode, 2006: 1154). According to this study, recipients of money tend to isolate themselves and to feel less obliged towards the institution responsible for the payment. The gesture of payment relegates the relationship to the purely economic sphere, in which characteristics, such as loyalty, play no role (see also Gneezy and Rustichini, 2000b).

In contrast, an award, once accepted, creates loyalty. A good example is the movie "The Kingdom of Heaven" by Ridley Scott, which tells about the fall of the Crusaders' kingdom. When the final assault is about to begin, the hero and chief organizer of the defense asks all the men ready to fight to kneel down and be knighted, as he is convinced that knighting the men turns them into better fighters (Scott, 2005).[6] This may create a feeling of commitment, because public recognition of the recipient on the part of the giver generates an emotional bond and because the award connects the winner with the institution. The recipient would devalue his or her own award if he or she were to downgrade the giver. A bond of loyalty is

[6] We owe this example to Hillel Rapoport.

therefore established between the giver and the recipient. While the strength of this bond varies, depending on the prize and the recipient, it is most likely stronger for awards than for monetary payments.

IV. Policy Options

The discussion reveals that money and awards differ substantially as incentive instruments in many ways. The main strengths of money as an incentive are its fungibility (consumption value), and the fact that it more easily serves as a credible signal of appreciation (Dur, 2008). Its main weaknesses are the often limited applicability, due to political, social, and economic restrictions, and the problems entailed in the necessary performance measurement. The main strengths of awards are their wide applicability (due to their discretionary nature), and their effectiveness, (due to their clear signaling capacity), motivation crowding-in, and the creation of loyalty. The main weakness of awards is the difficulty of the award-givers to commit themselves to keeping the number of awards scarce and therefore valuable. Further, the discretionary nature of awards implies that they are only taken seriously if there is considerable trust in the selection procedure.

Although money may, in principle, bring recognition and status, awards are more effective. This is due to the fact that monetary compensation is typically not publicized, and knowledge on differences in pay restricted to few, if any, close colleagues.

It follows that money is a valuable instrument to support scientific research if the price system is politically and socially accepted, if the research performance desired is well specified, if incomes are low (and the marginal utility of money high), if there is little need for signaling, and if the research output does not depend greatly on intrinsic motivation, which is often the case when routine rather than pathbreaking research is needed. Awards are the preferred

instruments if extraordinary research is to be furthered (the characteristics of which cannot be determined ex ante), if performance measurement is difficult, and if there is a need for a substantial amount of intrinsic motivation. Awards are preferable if signaling and a bond of loyalty are considered important.

It might seem obvious that the advantages of each instrument could be maximized and the disadvantages minimized by combining money and awards in a suitable way. This is done in many cases. Thus, for example, the Nobel Prize includes a considerable sum of money. However, one might well argue that connecting a prize with a substantial monetary bonus is a good strategy for a newly established prize to signal the seriousness of the intention to honor good research, and to make it prominent (prizes with higher monetary amounts may receive more press coverage and may be known by more people). As for the Nobel Prize, this might imply that the monetary component is in fact no longer needed and adds neither to the publicity of the award nor the incentive it provides. Indeed, the lobbying activities surrounding this prize suggest that many scholars would be prepared to *pay* a high monetary amount to receive it (as long as this were not revealed). But there are also examples of important awards in academia that are not associated with a monetary bonus, such as the John Bates Clark Medal of the American Economic Association, or honorary doctorates that do not come with money because their “seriousness”, and therefore value to the recipients, has been established by tradition and rules.

The danger of combining money and awards is that both instruments lose their advantages and the disadvantages remain. As discussed above, many prizes do not even publicize the amount of money that goes with them, or publicly downplay the role of the compensation. As soon as the monetary component becomes too salient, awards may, like performance pay, lead to motivation crowding-out, destroy self-signaling, and in turn lead to envy and sabotage.

There are certain conditions in which there is no trade-off because money and awards are

intrinsically linked. Even “pure” awards, without money attached, may have an indirect monetary effect by raising future income and, under some conditions, receiving money may bring social recognition, which is a more typical characteristic of awards. In most cases, it may well be that incentives involving money and awards cannot be separated. These deliberations make clear that careful consideration of the issues – such as the external circumstances, the kind of activity to be fostered, and the needs and wants of potential recipients of the prize – is necessary in order to decide whether money, an award, or a combination of both are the ideal incentive in a given situation. Many of the issues raised require careful empirical investigation.

V. Conclusions

The discussion reveals that our knowledge about the comparative efficiency of money and awards as incentive instruments is severely limited. While there is substantial knowledge about the functioning of money as an incentive, there is next to no serious empirical evidence on the effects of awards (see, for instance, the survey on incentives in firms by Prendergast, 1999). The properties and effects of awards have rarely been studied by economists or by other social scientists. In view of this large gap in knowledge, it is unwarranted to simply take money as the best and only effective motivator for scientific performance, as is implicitly done by the pay for performance programs recently applied in academia. The study of awards, and their performance compared to monetary incentives, is an area wide open for meaningful and fascinating research, and awards may well turn out to be a valuable and preferable incentive instrument in many circumstances in academia.

References

Adler, Robert, John Ewing, and Peter Taylor. 2008. "Citation Statistics. A Report from the International Mathematical Union." www.mathunion.org/fileadmin/IMU/Report/CitationStatistics.pdf.

Amabile, Teresa M. 1996. *Creativity in Context.* Boulder, CO: Westview Press.

Amabile, Teresa M. 1998. "How to kill creativity." *Harvard Business Review*, pp.76-87.

Auriol, Emmanuelle, and Régis Renault. 2008. "Status and Incentives." *The RAND Journal of Economics,* 39(1): 305-326.

Bénabou, Roland, and Jean Tirole. 2003. "Intrinsic and Extrinsic Motivation." *Review of Economic Studies*, vol. 70(3): 489-520.

Besley, Timothy, and Maithreesh Ghatak. 2008. "Status incentives." *American Economic Review, Papers and Proceedings,* 98: 206-211.

Blaug, Mark, and Howard R. Vane. 2003. *Who's Who in Economics.* Cheltenham: Edward Elgar Publishing Ltd.

Deaton, Angus. 2007. "Income, Aging, Health and Wellbeing around the World: Evidence from the Gallup World Poll." NBER Working Paper 13317.

Di Tella, Rafael, and Robert MacCulloch. 2006. "Happiness Adaptation to Income and to Status." Working Paper.

Dur, Robert. 2008. "Gift Exchange in the Workplace." Tinbergen Institute Discussion Paper, TI 2008-082/1.

Easterlin, Richard A. 1974. "Does economic growth improve the human lot? Some empirical evidence." In: Paul A. David and Melvin W. Reder (eds), *Nations and Households in Economic Growth, Essays in Honor of Moses Abramowitz.* New York: Academic Press: 89-125.

Easterlin, Richard A. 2003. "Explaining happiness." *Proceedings of the National Academy of Sciences,* 100: 11176-11183.

Frey, Bruno S. 1997. *Not Just for the Money: An Economic Theory of Personal Motivation*. Cheltenham: Edward Elgar Publishing Ltd.

Frey, Bruno S. 2005. "Knight Fever. Towards an Economics of Awards." Institute of Empirical Research in Economics, University of Zurich. CESifo Working Paper No. 1468. Available on SSRN: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=717302.

Frey, Bruno S. 2006. "Giving and Receiving Awards." *Perspectives on Psychological Science,* 1: 377-388.

Frey, Bruno S. 2007. "Awards as Compensation." *European Management Review,* 4: 6-14.

Frey, Bruno S., and Reto Jegen. 2001. "Motivation Crowding Theory: A Survey of Empirical Evidence." CESifo Working Paper. Available on SSRN: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=203330.

Frey, Bruno S., and Katja Rost. 2008. "Do rankings reflect research quality?" Working Paper, Institute for Empirical Research in Economics, University of Zurich.

Frey, Bruno S., and Alois Stutzer. 2002a. "What Can Economists Learn from Happiness Research?" *Journal of Economic Literature* 40(2): 402-435.

Frey, Bruno S., and Alois Stutzer. 2002b. *Happiness and Economics: How the Economy and Institutions Affect Well-Being*. Princeton, NJ: Princeton University Press.

Frey, Bruno S., and Alois Stutzer. 2006. "What Happiness Research Can Tell Us About Self-Control Problems and Utility Misprediction." Institute for Empirical Research in Economics Working Paper No. 267, University of Zurich.

Gavrila, Caius, Jonathan P. Caulkins, Gustav Feichtinger, Gernot Tragler, and Richard F.

Hartl. 2005. “Managing the Reputation of an Award to Motivate Performance.” *Mathematical Models of Operations Research,* 61: 1-22.

Gneezy, Uri, and Aldo Rustichini. 2000a. “Pay Enough or Don't Pay at All.” *Quarterly Journal of Economics,* 115: 791-810.

Gneezy, Uri, and Aldo Rustichini. 2000b. “A fine is a price.” *The Journal of Legal Studies,* vol. 29.

Hansen, Lee W., and Burton Weisbrod. 1972. “Toward a General Theory of Awards, or Do Economists Need a Hall of Fame?” *Journal of Political Economy,* 80: 422-431.

Merton, Robert K. 1973. *The Sociology of Science: Theoretical and Empirical Investigation.* Chicago: Chicago University Press.

Layard, Richard. 2005. *Happiness: Lessons from a new science.* London: Allen Lane.

Neckermann, Susanne, Reto Cueni, and Bruno S. Frey. 2008. “What is an Award Worth? An Econometric Assessment of the Impact of Awards on Employee Performance.” Mimeo, University of Zurich.

Neckermann, Susanne, and Bruno S. Frey. 2007. “Awards as Incentives.” Institute for Empirical Research in Economics Working Paper No. 334, University of Zurich.

Neckermann, Susanne, and Michael Kosfeld. 2008. “Working for Nothing? The Effect of Non-material Awards on Employee Performance.” Mimeo, University of Zurich.

Osterloh, Margit, and Bruno S. Frey. 2008. “Anreize im Wissenschaftssystem.” Working Paper, Institute for Empirical Research in Economics, University of Zurich.

Polanyi, Michael. 1962. “The Republic of Science: its Political and Economic Theory.” *Minerva,* 1: 54-73.

Prendergast, Canice. 1999. “The Provision of Incentives in Firms.” *Journal of Economic*

Literature, 37: 7-63.

Scott, Ridley. 2005. *Kingdom of Heaven.* New York: Newmarket Press.

Vohs, Kathleen D., Nicole L. Mead, and Miranda R. Goode. 2006. "The Psychological Consequences of Money." *Science,* 314, 17 November: 1154-1156.

Waldfogel, Joel. 1993. "The Deadweight Loss of Christmas." *American Economic Review,* 83(5): 1328-1336.